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Sanitized Copy Approved for Release 2011/09/14 : CIA-RDP80-00809A000700190153-0

SOVIET WORK ON THE TOXICITY OF THE INFLUENZA VIRUS

[The following is a review of L. Ya. Zakstel'skaya's monograph, Toxicity of the Virus of Influenza, published by the Academy of Medical Sciences USSR, 1953, 84 pp. The monograph, reviewed by Prof F. M. Zhdanov, Chief, Main Sanitary-Antiepidemic Administration, Ministry of Public Health USSR, appeared in Byulleten' Eksperimental'noy Biologii i Meditsiny, Vol 37, No 2, (pp 78-79), published in Moscow, February 1954.]

The problem of influenza occupies an important place in the work done by scientific research institutes of the Academy of Medical Sciences USSR and by the specialized branch institutes of the Ministry of Public Health USSR. Many practical achievements in this field may be noted. These achievements include the production of living vaccines for the prophylactic immunization against influenza and the development of therapeutic sera and antibiotics which are now being tested on an extensive scale in order to arrive at a definite decision regarding their introduction into practical use. Practical achievements in this field are closely connected with investigations being carried out on an extensive scale, dealing with the biological properties of the causative factors of influenza and the phenomena of pathogenesis and immunity in connection with influenza infection. One of the least-investigated problems is the pathogenesis of the toxic syndrome in influenza. The existence of this syndrome is well known to clinicists. Zakstel'skaya's monograph supplements to a considerable extent our inadequate knowledge of this subject.

In contradistinction to the correct views of USSR scientists on the intoxication syndrome in influenza, foreign biologists still regard the problem from the standpoint of Virchowianism. They are of the opinion that the pathogenesis of influenza is of local origin and treat the influenza infection as a cell infection. In other words, they believe that the toxic state in influenza is the result of the resorption of products of the decomposition of cells.

Zakstel'skaya correctly assumes that intoxication in influenza is caused by the virus which produces influenza. She has carried out numerous investigations which deal with the toxic properties of the influenza virus. The principal part of the monograph being reviewed is devoted to an account of the results obtained in these investigations.

Zakstel'skaya has applied various methods which enabled her to demonstrate the toxic action of the virus of influenza. These included intravenous injection of the virus to laboratory animals. White mice proved to be the most sensitive to the virus. The virus was also introduced into the anterior ocular chamber of guinea pigs and rabbits and tested by B. N. Tarusov's method of tissue suriction. In all experiments, the presence of toxic properties in influenza viruses was conclusively proven. The pathology of the influenza intoxication was investigated in detail.

In the investigation of the nature of the toxic factor, it could be shown that its activity is closely connected with the presence of living particles of virus. This constitutes a difference between the toxic factor of influenza virus and bacterial toxins. The toxic factor of influenza is highly specific with reference to the species and even varieties of the influenza virus. It is neutralized by the corresponding immune serums. In the acute stage of the disease, it can be detected in the blood of patients. The immunity to influenza

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which has been developed by the organism is not only anti-infectious but also antitoxic. Investigation of the toxic properties of the viruses of influenza enabled the author of the monograph to utilize them for the characterization of various strains of the influenza virus and also for the investigation of immunological properties of influenza vaccines, as well as for diagnostic tests.

In the final part of the monograph, the author makes an attempt to establish a connection between the data reported by her and general problems of the pathogenesis of influenza from the standpoint of Pavlov's physiological teaching.

In the book reviewed, one of the most important problems of the pathogenesis of influenza has received a correct and matter-of-fact solution.

Of course, Zakstel'skaya's work does not settle completely the question in regard to the nature of the toxic state in influenza. Furthermore, only one side of the problem has been dealt with, namely, the toxic properties of the virus. Another aspect of the problem, the mechanism of the injurious effect exerted by the virus of influenza and its toxic factor on the human organism, has not been clarified. This is the main shortcoming of the book. One might express the wish that this part of the problem should be solved in the shortest possible time, because its solution would aid in developing a basis for the pathogenetic therapy of influenza. One should also establish a closer connection between the results of the investigations described and the general problems of the pathogenesis of influenza.

Zakstel'skaya basically evaluates her experimental data in a correct manner. But one can hardly agree with her assertion that the blood of a human being infected with epidemic influenza changes its physiological properties in such a manner that a specific toxicity and a specific influenza antigen are developed. There is no reason to regard the effects of the circulation of the influenza virus in the blood as caused by some sort of change in the physiological properties of the blood.

However, the faults which have been pointed out do not detract from the value of the book, because the fundamental problem indicated by the title of the book has received a correct solution.

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